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AN ABSTRACT OF Mr *CHARLES LABELYE*'s REPORT,

Relating to the IMPROVEMENT of the

RIVER WEAR,

AND

PORT of *SUNDERLAND*,

Made in JULY 1748.

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NEWCASTLE UPON TYNE:

AN
ABSTRACT
OF
Mr *Charles Labelye*'s REPORT, &c.

☞ *The Figures at the Foot refer to the reſpective Pages of the* REPORT.

A general Account of the Harbour.

THE *Wear* forms itſelf into a natural *Baſon* over-againſt *Sunderland*, which is contracted in Breadth, and conſequently deepen'd, *(a)* before it comes againſt the Cuſtom-houſe; which Breadth is and will be ſtill further leſſen'd by the Tide's continuing to waſh the Ballaſt Heaps down into the River, till a proper Stop be put to the growing Evil.----From hence the Current paſſes in a pretty ſtreight Direction towards the Sea, widening gradually, and the Depth decreaſing, till it comes at the *Stell* and *Stell-Caunch*, which I call the INNER BAR, and which is more prejudicial to Navigation than the OUTER BAR. From this *Inner* to the *Outer Bar*, the Water divides itſelf into ſeveral Branches, but chiefly runs in two Channels, the one paſſing by the two Beacons, the other nearer to the South Pier; on the Inſide of which Pier, as well as on the Outſide, *(b)* a conſiderable Quantity of Sand has been lately gather'd.

Mouth of the River.

The Mouth of the River is conſiderably imbayed, by the eaſtward Projection of the Coaſt on both Sides, *(c)* and the Tides ſet into the Harbour from all the Parts of the Bay, but moſt from the South Eaſt Point.

Prejudices.

The Goodneſs of both the *River* and *Harbour* is greatly impair'd by many injurious Circumſtances and Prejudices; the principal of which that I ſhall obſerve, are,

Seven Ways prejudic'd.

I. Several Shoals and Banks of Sand, which interrupt the Navigation of the *Keels* down the River (*d*); two of which, eſteem'd to be the worſt, are *Forſter*'s and *Cyngden Sands*.

II. The Harbour is much injur'd by the Rubbiſh (*e*), Filth and Mud, which fall into the River from the Town.

III. By the increaſing Contraction of the River, nearly oppoſite to the Cuſtom-houſe (*f*); which, if ſuffer'd to proceed, will be the utter Ruin of the Haven, and alſo greatly endanger the Wharfs and Buildings adjoining.

IV. The next Prejudice is the *Stell* (*g*), which conſiſts of a Bed of Gravel and Sand, with ſome larger Beach Stones (*h*); and is ſo ſhallow, that a Ship drawing nine or ten Feet of Water cannot ſafely paſs over it.

V. The Water at the Stell dividing itſelf into many Channels or Streams (*i*).

VI. The great Danger which the Shipping is expoſed to in the Harbour by tempeſtuous Seas (*k*), when violent Winds blow from the N. E. or E.

VII. Ballaſt caſt in the *Road*, which the Flood Tides drive into the River, and thereby increaſe the Prejudice of other Sands.

Propoſals for Remedies and Improvements.

To prevent the River and Haven from growing worſe, to remedy in a great meaſure theſe Prejudices, and to improve the Harbour and River, the following *Propoſals* are made, and here laid down in the ſame *Order* that they are adviſed to be performed.

Firſt, That the River above the Town be cleared of Sands (*l*) and Shoals, which obſtruct the Navigation of the Keels, particularly at *Foſter*'s and *Cyngden Sands* (*m*); the Means and Methods of doing which are very obvious, *viz.* by contracting the Channel at thoſe Places where the Obſtructions are, and a little Way above them, that the increaſed Velocity of the Stream may ſcour them away: In order to which I propoſe one fourth of the preſent Water-Way to be taken in, by proper *Stone Wharfs* and *Jetties*; particularly

Work to be done at *Cyngden Sands*.

At *Cyngden Sands*, I adviſe that the preſent *Jetty* be repair'd, and joined to the North Shore at both its Extremities, and then back'd with Earth or Sand.

At *Foſter's Sand.*

At *Foſter*'s *Sand* the River to be conſiderably contracted with *Stone Wharfs*, accordingly as I have mark'd with *ſtrong red Lines* on Mr *Thompſon*'s *Plan*, where I think the Face of theſe Wharfs ſhould be placed. I adviſe to begin by wharfing from the Eaſt Side of *North Biddick Burn*, to the Eaſt End of the ſaid *Sand*, and then try what one Winter will do towards ſcouring away the Obſtructions; which, if not found effectual, they muſt be taken up by Dint of Labour, or the River muſt be contracted all the Way to the Elbow next below, by a Wall whoſe Front I have alſo mark'd in the ſaid Plan by a Row of *red Dotts:* After which, at convenient Times, the Sands may be eaſily taken up and thrown behind the ſaid Walls, in order to deepen the Channel a Foot or two at low Water. In ſome Places I think it adviſable to *harrow* the Bed of the River, eſpecially at the latter End of Summer, ſo that the Sands and other Soils may be more readily waſhed away by Land Floods. If all theſe Remedies prove ineffectual, *Ballaſt Engines* muſt be ſet to Work as on the River *Thames*.

A Caution.

In relation to the Harbour, I adviſe againſt ever incroaching upon the *Baſon (n)*, or taking any Part of it in, by wharfing; becauſe it will deprive you of an uſeful Stock of Back-water. But,

Work to be done.

Secondly, The next Work to be done, is, to provide a Remedy againſt the choaking up of the River, near oppoſite to the Cuſtom-Houſe, by the Sands being continually ſwept into it from the Ballaſt-Hills, &c. To effectuate which *(o)*, I recommend wharfing *in* that Part of the River and the *Ham Sand*; and, after leaving a proper Landing-place for the *Ferry-Boat*, as may be ſeen in the *Draughts*, I propoſe the ſaid Wharf ſhould begin there, and thence run nearly in a parallel Direction to the oppoſite Wharfs on the South Side of the River, and be continued down to the *Stell*, and no further for the preſent. The Sands already lodged in the River, I propoſe to be taken up and caſt behind this North Wharf, all along to the Foot of it.

At a North-Key.

At the Stell.

Thirdly, The next Thing of Importance is to take up the *Stell (p)*, which no conjoint Force of Tides and Land Floods is able to remove.----It ſhould be deepen'd two or three Feet from the Surface, which much be done by Art and Labour.

A North Pier propos'd.

Fourthly, The better to cover the Haven, and ſecure the Ships from being endanger'd by great Seas and violent Winds ſetting right up the Harbour *(q)*, I propoſe a *North Pier*, The North Pier.

which will greatly contribute to it; tho' at this Place it is not practicable to ſhelter the Ships in the Haven entirely from all Winds. The Length, Shape, and Poſition of the North Pier which I recommend, will be beſt explain'd by the *Draughts* annex'd. I propoſe the Head of this Pier to be placed exactly North (by the Compaſs) off the South Pier; becauſe, 1*ſt*, Such is the Setting of the Tides. 2*dly*, If the ſaid Head were placed Eaſtward (*r*), it would ſtop part of the Flood and Ebb, and ſoon gather vaſt Quantities of Sand within it; and if it ſtood to the Weſtward, it would not ſhelter the Haven ſo well. 3*dly*, The Poſition recommended, agrees with the Experience and Practice of all good Engineers.----I propoſe it ſhould not advance further from the North High-lands (*s*) than is repreſented in the *Draughts*: 1*ſt*, Becauſe I think it proper to leave an Interval of about 200 Yards, leſt the Entrance of the Haven ſhould be made too difficult in rough Weather; and I propoſe to contract the Current, a little Way farther up, into about 100 Yards in Breadth; which is the uſual Breadth allowed to moſt Entrances of this kind. 2*dly*, Becauſe the ſo placing the North Pier will moderate the Expence.------*Laſtly*, I propoſe it to bend inward; becauſe it will be ſtronger to reſiſt the Violence of the Seas than if quite ſtreight: tho' there's much leſs in the Shape of Piers than ſome People imagine. I propoſe the *North Pier* to be built full as high all the Way as the *South Pier*, and to have a *Parapet Wall* on the Eaſt Side, with *Merlins*, *Embraſures*, and a *Stone Plat-form* for Cannon; alſo *mooring Poſts*, *Crabs*, or *Capſtanes*, and *Blocks*.----I think it need not be quite ſo broad as the South Pier (*t*); 20, or 25 Feet at the Top, will be ſufficient; but I would have it to *batter* full one Sixth of its Height, or two Inches in every Foot: likewiſe ſtrengthened on the Outſide by a continued *Breakwater*, *Berm*, or *Foreland*, made of large Pebbles. ☞ *After all, as no Man can foreſee all the Conſequences that may attend the erecting a North Pier; if it ſhould happen to occaſion viſibly (which I hope it will not) a greater Obſtruction to Navigation than it removes, it muſt be unbuilt and taken up.*

The ſeveral Channels reduced to one, by Wharfing.

Fifthly, I propoſe that the ſeveral Channels (*u*), now ſeparated at the Stell, be in the next Place reduced into one, by wharfing it into a convenient Breadth all along from the Town to the Pier Heads; for, ſo long as two Channels remain, neither of them can be ſo deep as is requiſite; but when brought together, and

ſo

ſo confined, will, jointly with the Baſon, form a commodious Haven, commonly called a LONG-HARBOUR; of which ſort moſt of the good ones in *Europe* are found to be. What is here propoſed may be effected two Ways *(x)*, and accordingly have I annexed two Draughts; the firſt, edged with red Silk, where the Haven is reduced into the South Channel: the ſecond, edged with blue Silk, where it is contracted into the North Channel. ----Each of theſe Schemes has its peculiar Advantages and Diſadvantages.----If the South Channel only be preſerved, the Current will ſet in a much ſtreighter Direction, and conſequently the ebbing Tides and Freſhes will have a greater Effect in ſcouring and deepening the Channel; it will alſo require leſs Time and Expence, the South Side being already built, and the Wharfing on the North Side will be the only new Work required from the End of the Wall at the Stell (already adviſed to built) down to the North Pier Head, as deſcribed in the Draught edged with red Silk. But in this Caſe the Shipping will not be be quite ſo well ſhelter'd as by the other Scheme, *viz.* If the North Channel only be made Uſe of, as in the Draught edged with blue Silk, the Shipping will be better ſhelter'd; but the Courſe of the River being more crooked, the Ebbs and Land Floods will have leſs Force to ſcour and deepen the Channel, than in the firſt Scheme, and the Time and Expence to put it in execution will be conſiderably greater; not only becauſe the North Channel muſt be wharfed on both Sides, from the Stell to the Pier Heads, but alſo the South Pier muſt be lengthened in a Sweep towards the North Weſt *(y)*, as expreſſed in the Draught edged with blue.----By comparing the two Draughts together, it will be ſeen that the North Wall, as far as the Stell, is equally ſubſervient to both Schemes; and therefore that Work is the more neceſſary to be begun very ſoon: and after it is finiſhed, and well backed with Sands, and the *North Pier* is alſo built, ſuſpend the further Works two or three Years, and obſerve the Effects on the *Courſe*, *Setting*, *Strength* and *Duration* of the *Tides*; and alſo as to gathering Sands on both Sides of the *North Pier*: after which, I apprehend, the River itſelf will point out which of the Channels ought to be preſerved: The deepeſt muſt be choſen, and I doubt not but it will prove to be the South Channel.

Two Ways propoſed.

Firſt Method.

Second Method.

Sixthly, As to the *Outer Bar (z)*, it will always remain, and perhaps increaſe, unleſs ſome Means can be uſed to remove it further

The Bar.

A Query relating to the Bar anſwered.

further into the Sea, or at leaſt to lower its Surface, and ſo deepen the Water over it. I would adviſe to have it taken up in calm Weather with Ballaſt Engines *(a)*, ſo as to make a *Sledway*, or *Paſſage*, thro' it, which Ships may be eaſily directed into, by Means of *Beacons*, or *Light-houſes*. ----A Query may probably be made here *(b)*, Whether it would not be adviſable to continue both *Piers* quite down to the *Bar*, at ſuch a Diſtance as would confine the *ebb Tides* and *Freſhes* within a proper Channel, ſo as to remove and force away the *Obſtructions*, and caſt the *Bar* farther out? To this I anſwer; It would be a Work of very great Expence, and the Removal of the *Bar* thereby would be moſt uncertain and precarious? for the Action of the Tides would ſtill bring Sand and Ballaſt from the *Road*; and the River, upon falling into the open Sea, would immediately loſe its Velocity *(c)*, and thereby drop the Sand and Silt brought along with it: which, together, would, in all Probability, form a new Bar, at a very inconſiderable Diſtance from the old one.

Objection about confining the Channel removed.

In caſe any one ſhould doubt, that confining the Haven within one Channel might reſtrain the Tides from flowing as freely into the Harbour, and as far up the River as they now do; it will be proper to obſerve, that Fluids do not act or preſs in proportion to their Quantities, or the Surfaces on which they ſtand, but according to their perpendicular Altitudes only; ſo that the Height to which the Water riſes in the Harbour, and up the River, depending upon the Height it riſes to in the *Offing*, the ſame Thing will happen whether the Harbour be contracted or not.

A neceſſary Caution.

Before the Concluſion of this Report *(d)*, one Caution more is thought neceſſary; which is, that the Commiſſioners may never hearken to any Propoſal for erecting Sluices, or Locks, acroſs the River, in any Place which the Tide reaches; for let the Pretences of ſuch Works be ever ſo ſpecious, and the Reaſons for them ever ſo plauſible, be aſſured that the infallible Conſequence of all ſuch Projects would be the utter Ruin of the Harbour, and its Navigation, in a few Years.

(a) 25. *(b)* 26. *(c)* 27. *(d)* 28.